Canadian Data Report

Fisheries and Aquatic Sciences No. 385

PRIMARY PRODUCTIVITY AND NUTRIENT MEASUREMENTS IN NORTHERN FOXE BASIN, N.W.T. FROM 27 AUGUST TO 7 SEPTEMTER 1981

B. Irwin, L. Harris, M. Hodgson, E. Horne and T. Platt

Marine Ecology Laboratory
Ocean Sciences and Surveys, Atlantic
Department of Fisheries and Oceans

Bedford Institute of Oceanography
P.O. Box 1006
Dartmouth, Nova Scotia B2Y 4A2

This is the sixtieth Data Report from the Marine Ecology Laboratory, Dartmouth.

2008-04908/

© Minister of Supply and Services Canada 1983

Cat. No. Fs 97-13/385 ISSN 0706-6465

Correct citation for this publication:

Irwin, B., L. Harris, M. Hodgson, E. Horne and T. Platt. 1983. Primary Productivity and Nutrient Measurements in Northern Foxe Basin, N.W.T. from 27 August to 7 September 1981. Can. Data Rept. Fish. Aquat. Sci. No. 385: 40 p.

CONTENTS

	Page
Abstract/Résumé	iv
Introduction	1
Sampling	1
Methods	1
Size Fractionation	2
Organic Particulates	2
Nutrients	2
Incubation Light Intensity	3
Estimation of Photosynthetic Parameters	3
Acknowledgements	3
References	3
Table Legend	5
Inorganic Nutrient and Chlorophyll Concentrations	7
Table Legend	17
Size Fractioned Organic Particulates	19
Table Legend	25
Symbols and Abbreviations	26
Light Saturation Data and Parameter Estimates	27
Figure	40

Abstract

Irwin, B., L. Harris, M. Hodgson, E. Horne and T. Platt. 1983. Primary Productivity and Nutrient Measurements in Northern Foxe Basin, N.W.T. from 27 August to 7 September 1981. Can. Data Rept. Fish. Aquat. Sci. No. 385: 40 p.

During the period 27 August to 7 September 1981 a series of primary productivity experiments were conducted on board CSS Baffin in Foxe Basin (N.W.T.). Corresponding nutrient and physical parameters were measured for the same samples. In this report we make available the raw data and the fitted light saturation parameters.

Résumé

Irwin, B., L. Harris, M. Hodgson, E. Horne and T. Platt. 1983. Primary Productivity and Nutrient Measurements in Northern Foxe Basin, N.W.T. from 27 August to 7 September 1981. Can. Data Rept. Fish. Aquat. Sci. No. 385: 40 p.

Pendant la période du 27 août au 7 septembre une série d'expériences de productivité primarie ont été effectueés à bord du CSS Baffin dans le Bassin de Foxe (T.N.O.). Les éléments nutritifs et les paramètres phisiques correspondant ont été measurées sur les mêmes échantillions. Le present rapport contient les données brutes et les paramètres lissés de saturation lumineuse.

Introduction

This is the seventh in a series of data reports giving results of experiments on photosynthesis versus light intensity for natural phytoplankton populations in the north Atlantic and adjacent waters north of 50° north. Samples were collected from CSS Baffin during a cruise in Northern Foxe Basin, NWT over the period 27 August to 7 September 1981. This was a joint cruise with the Hydrographic Division, Ocean and Aquatic Sciences, Atlantic.

Sampling

Water samples for chlorophyll and inorganic nutrients were collected at 5 m intervals in the upper 40 m and 10 or 20 m intervals from 40 m to near bottom with 5 l Niskin bottles. Samples for primary productivity measurements were collected with 30 l Niskin bottles or off the surface with a plastic bucket. When tide and ice conditions permitted, vertical net tows were taken with a 0.25 m plankton net (mesh size 20 μm). Station positions are shown in Fig. 1.

Methods

Productivity

Primary productivity was measured using the ^{14}C method as described in Strickland and Parsons (1972). Sodium bicarbonate ^{14}C solution was added to 5 l of sample to yield an approximate activity of 5 μci per 100 ml aliquot. Fourty-three light and 2 dark bottles were placed in temperature controlled incubators. Temperature was maintained at in situ temperatures by Forma Scientific model 2160 circulating water baths. Illumination was provided by 2000 watt tungsten halogen lamps (New Haline OHS 2000) having a

maximum light intensity of 1000 Wm^{-2} PAR. All incubations were terminated after 3 hours. Samples were filtered onto 2.5 cm Whatman GF/F glass fibre filters. Filters were dried, exposed to HCl fumes and counted in a liquid scintillation counter on board ship.

Size Fractionation

Organic particulates were fractioned into two components - the whole sample and the < 1 µm fraction. Whole samples were filtered directly onto filters - usually Whatman GF/F. The < 1 µm fraction was the biomass captured on a Whatman GF/F filter from a sample that had been prescreened through a Nuclepore 1.0 µm pore size filter.

Organic Particulates

Chlorophyll a, nucleic acids, particulate organic carbon, particulate organic nitrogen, adenosine triphosphate and protein were measured using methods described in Irwin et al. (1982).

Nutrients

Four inorganic nutrients were measured on samples collected for light saturation experiments. Samples were frozen at -20°C and later analysed in the laboratory using the following methods.

Nitrate - Industrial method 155-71 W (Technicon)

Silicate - Industrial method 158-71 W (Technicon)

Phosphate was measured using the Murphy and Riley (1962) single solution method and ammonia was measured using the phenolhypochlorite method of Solorzano (1969).

On all other samples, nitrate, phosphate and silicate were measured.

Incubation Light Intensity

Photosynthetically active radiation (PAR) was measured at each bottle position using a Licor Li 185A quantum meter fitted with a 190S underwater quantum sensor.

Estimation of Photosynthetic Parameters

Photosynthetic parameters were estimated using the techniques described in Irwin et al. (1982) and Platt et al. (1981).

Acknowledgements

We wish to thank Dave Rudderham and Carla Caverhill for their assistance in the calculation of the light saturation parameters.

References

IRWIN, B., T. PLATT, W.G. HARRISON, C.L. GALLEGOS and P. LINDLEY. 1982. Phytoplankton productivity experiments and nutrient measurements in Ungava Bay NWT from August 1 to September 3, 1979. Can. Data Rept. Fish. Aquat. Sci. No. 287: 208 pages.

MURPHY, J. and J.P. RILEY. 1962. A modified single solution method for the determination of phosphate in natural waters. Anal. Chem. Acta. 27: 31-36.

PLATT, T., C.L. GALLEGOS, and W.G. HARRISON. 1981. Photoinhibition of photosynthesis in natural assemblages of marine phytoplankton. J. Mar. Res. 38 (4): 687-701.

SOLORZANO, L. 1969. Determination of ammonia in natural waters by the phenolhypochlorite method. Limnol. Oceanogr. 14: 799-801.

STRICKLAND, J.D.H., and T.R. PARSONS. 1972. A practical handbook of sea water analysis. Bull. Fish. Res. Board Can., No. 617: 311 pp.

INORGANIC NUTRIENT AND CHLOROPHYLL CONCENTRATIONS

FOXE BASIN

Latitude 69°08'N Longitude 80°11'W Date: 28:08:81

Depth m	Nitrate mg at m^{-3}	Silicate mg at m^{-3}	Phosphate mg at m^{-3}	Chlorophyll mg m^{-3}
0	0.59	2.16	0.92	0.23
5	0.50	1.76	0.72	0.31
10	0.78	1.88	0.68	0.20
15	1.37	2.81	0.75	0.26
20	0.46	2.04	0.64	0.23
25	0.47	2.03	0.57	0.26
30	0.20	2.03	0.70	0.20
35	0.34	2.28	0.70	0.24
40	0.00	1.92	0.63	0.23

FOXE BASIN

Latitude 69°24'N Longitude 80°48'W Date: 29:08:81

Depth m	Nitrate mg at m^{-3}	Silicate mg at m^{-3}	Phosphate mg at m^{-3}	Chlorophyll mg m^{-3}
0	0.38	1.87	1.29	1.85
5	0.26	1.59	0.72	1.32
10	0.29	2.09	0.67	1.18
15	0.28	1.82	0.67	1.36
20	0.21	1.42	0.66	1.49
25	0.86	3.25	0.81	2.14
30	0.19	1.26	0.63	1.50
35	0.65	2.22	0.62	1.50
40	0.75	2.29	0.71	1.26
45	0.62	2.79	0.68	1.78
50	0.20	1.75	0.72	1.54
55	0.72	2.05	0.77	1.78
60	0.41	1.95	0.67	2.08
65	0.42	1.80	0.75	1.49

FOXE BASIN

Latitude 69°09'N Longitude 80°13'W Date: 30:08:81

Depth m	Nitrate mg at m^{-3}	Silicate mg at m^{-3}	Phosphate mg at m^{-3}	Chlorophyll mg m^{-3}
0	0.37	1.93	0.97	0.29
5	0.77	1.96	0.56	0.31
10	0.77	1.86	0.66	0.39
15	0.33	1.95	0.65	0.34
20	0.28	1.88	0.58	0.24
25	0.03	2.01	0.73	0.30

FOXE BASIN

Latitude 69°24'N Longitude 80°51'W Date: 31:08:81

Depth m	Nitrate mg at m^{-3}	Silicate mg at m^{-3}	Phosphate mg at m^{-3}	Chlorophyll mg m^{-3}
0	0.20	2.18	0.95	1.16
5	0.53	2.06	0.80	0.81
10	0.58	1.91	0.83	0.80
15	0.28	1.94	0.66	0.51
20	0.26	1.86	0.76	0.78
25	0.32	1.75	0.69	0.82
30	0.27	1.52	0.69	0.78
35	0.22	1.55	0.69	0.72
40	0.00	1.54	0.67	0.80
50	0.00	2.33	0.73	0.51
60	0.03	2.08	0.81	0.48
70	0.31	2.28	0.74	0.67
80	0.11	2.38	0.73	0.76
90	0.41	2.86	0.67	0.67

FOXE BASIN

Latitude 69°26'N Longitude 80°47'W Date: 01:09:81

Depth m	Nitrate mg at m^{-3}	Silicate mg at m^{-3}	Phosphate mg at m^{-3}	Chlorophyll mg m^{-3}
0	0.26	0.79	1.09	1.32
5	0.39	0.94	0.73	0.89
10	0.63	1.21	0.78	0.85
15	0.81	1.16	0.71	0.83
20	0.99	1.77	0.77	0.50
25	0.32	1.60	0.75	0.52
30	0.68	1.57	0.79	0.58
35	0.28	1.72	0.68	0.57

FOXE BASIN

Latitude 68°46'N Longitude 81°09'W Date: 02:09:81

Depth m	Nitrate mg at m^{-3}	Silicate mg at m^{-3}	Phosphate mg at m^{-3}	Chlorophyll mg m^{-3}
0	0.15	1.71	0.92	0.33
5	0.25	2.17	0.74	0.35
10	0.04	1.57	0.74	0.32
15	0.25	1.80	0.79	0.36
20	0.04	1.87	0.66	0.45

FOXE BASIN

Latitude 68°21'N Longitude 79°58'W Date: 04:09:81

Depth m	Nitrate mg at m^{-3}	Silicate mg at m^{-3}	Phosphate mg at m^{-3}	Chlorophyll mg m^{-3}
0	1.87	4.42	0.84	1.56
5	1.64	4.23	0.77	1.56
10	2.30	4.14	0.66	1.27
15	1.86	4.52	0.77	1.45
20	1.91	4.65	0.77	1.07
25	1.47	3.26	0.75	1.12
30	1.47	3.31	0.86	1.07
35	0.42	1.99	0.79	0.60
40	1.48	3.71	0.90	1.09
60	1.46	3.44	0.86	0.42
80	2.06	4.80	1.04	0.45

FOXE BASIN

Latitude 69°42'N Longitude 81°51'W Date: 05:09:81

Depth m	Nitrate mg at m^{-3}	Silicate mg at m^{-3}	Phosphate mg at m^{-3}	Chlorophyll mg m^{-3}
0	1.08	3.49	0.89	2.14
5	1.04	3.45	0.80	1.90
10	1.08	3.09	0.77	1.84
15	1.36	3.35	0.78	1.50
20	1.59	3.57	0.81	1.43
25	1.27	3.17	0.74	1.43
30	1.03	2.81	0.76	1.25
35	0.90	2.86	0.71	1.36
40	0.81	2.70	0.79	0.72
60	1.41	3.90	0.90	0.40
80	1.59	4.38	0.99	0.45

FOXE BASIN

Latitude 69°00'N Longitude 79°54'W Date: 06:09:81

Depth m	Nitrate mg at m^{-3}	Silicate mg at m^{-3}	Phosphate mg at m^{-3}	Chlorophyll mg m^{-3}
0	0.00	3.87	1.03	0.80
5	0.00	2.79	0.58	0.92
10	0.24	2.65	0.98	0.78
15	0.07	2.75	0.68	0.83
20	0.27	2.82	0.67	0.74
25	0.20	2.92	0.79	0.72
30	0.20	2.53	0.82	0.72
35	0.27	2.49	0.75	0.89

FOXE BASIN

Latitude 68°22'N Longitude 80°67'W Date: 07:09:81

Depth m	Nitrate mg at m^{-3}	Silicate mg at m^{-3}	Phosphate mg at m^{-3}	Chlorophyll mg m^{-3}
0	0.05	3.09	0.62	0.59
5	0.18	3.25	0.70	0.48
10	0.25	3.26	0.64	0.56
15	0.26	3.32	0.66	0.42
20	0.32	3.26	0.54	0.48
25	0.28	3.59	0.52	0.45

SIZE FRACTIONED ORGANIC PARTICULATES

FOXE BASIN

Latitude 69°08'N Longitude 80°11'W Date: 28:08:81

Depth m	Nitrate mg at m^{-3}	Silicate mg at m^{-3}	Phosphate mg at m^{-3}	Ammonia mg at m^{-3}
5	0.64	2.20	0.77	1.08

	Chlorophyll mg m^{-3}	Carbon mg m^{-3}	Nitrogen mg m^{-3}	ATP mg m^{-3}
Whole Sample	0.22	126	22	0.552
<1 µm Fraction	0.08	72	17	0.030

	RNA mg m^{-3}	DNA mg m^{-3}	Protein mg m^{-3}
Whole Sample	1.71	7.10	44.5
<1 µm Fraction	0.90	2.35	8.3

Latitude 69°21'N Longitude 80°47'W Date: 29:08:81

Depth m	Nitrate mg at m^{-3}	Silicate mg at m^{-3}	Phosphate mg at m^{-3}	Ammonia mg at m^{-3}
40	0.39	2.37	0.75	1.03

	Chlorophyll mg m^{-3}	Carbon mg m^{-3}	Nitrogen mg m^{-3}	ATP mg m^{-3}
Whole Sample	0.78	130	25	0.566
<1 µm Fraction	0.09	55	14	0.022

	RNA mg m^{-3}	DNA mg m^{-3}	Protein mg m^{-3}
Whole Sample	4.49	4.89	78.6
<1 µm Fraction	0.90	2.82	23.2

FOXE BASIN

Latitude 69°09'N Longitude 80°13'W Date: 30:08:81

Depth m	Nitrate mg at m^{-3}	Silicate mg at m^{-3}	Phosphate mg at m^{-3}	Ammonia mg at m^{-3}
30	0.83	2.00	0.54	1.06

	Chlorophyll mg m^{-3}	Carbon mg m^{-3}	Nitrogen mg m^{-3}	ATP mg m^{-3}
Whole Sample	0.29	56	12	0.730
<1 µm Fraction	0.21	35	10	0.053

	RNA mg m^{-3}	DNA mg m^{-3}	Protein mg m^{-3}
Whole Sample	1.80	4.47	95.6
<1 µm Fraction	0.18	1.40	15.8

Latitude 69°24'N Longitude 80°51'W Date: 31:08:81

Depth m	Nitrate mg at m^{-3}	Silicate mg at m^{-3}	Phosphate mg at m^{-3}	Ammonia mg at m^{-3}
40	1.83	2.77	0.58	1.81

	Chlorophyll mg m^{-3}	Carbon mg m^{-3}	Nitrogen mg m^{-3}	ATP mg m^{-3}
Whole Sample	1.03	144	16	0.790
<1 µm Fraction	0.18	41	12	0.048

	RNA mg m^{-3}	DNA mg m^{-3}	Protein mg m^{-3}
Whole Sample	2.34	3.71	91.0
<1 µm Fraction	0.18	0.94	21.2

FOXE BASIN

Latitude 69°26'N Longitude 80°47'W Date: 01:09:81

Depth m	Nitrate mg at m^{-3}	Silicate mg at m^{-3}	Phosphate mg at m^{-3}	Ammonia mg at m^{-3}
40	0.27	1.83	0.79	0.99

	Chlorophyll mg m^{-3}	Carbon mg m^{-3}	Nitrogen mg m^{-3}	ATP mg m^{-3}
Whole Sample	0.48	106	19	0.499
<1 µm Fraction	-	52	6	-

	RNA mg m^{-3}	DNA mg m^{-3}	Protein mg m^{-3}
Whole Sample	5.22	4.89	93.2
<1 µm Fraction	-	-	-

Latitude 68°46'N Longitude 81°09'W Date: 02:09:81

Depth m	Nitrate mg at m^{-3}	Silicate mg at m^{-3}	Phosphate mg at m^{-3}	Ammonia mg at m^{-3}
2	0.42	1.76	0.63	1.30

	Chlorophyll mg m^{-3}	Carbon mg m^{-3}	Nitrogen mg m^{-3}	ATP mg m^{-3}
Whole Sample	0.44	166	20	0.452
<1 µm Fraction	0.10	52	9	0.158

	RNA mg m^{-3}	DNA mg m^{-3}	Protein mg m^{-3}
Whole Sample	3.86	4.32	81.1
<1 µm Fraction	1.80	-	21.2

FOXE BASIN

Latitude 68°21'N Longitude 79°58'W Date: 03:09:81

Depth m	Nitrate mg at m^{-3}	Silicate mg at m^{-3}	Phosphate mg at m^{-3}	Ammonia mg at m^{-3}
0	0.12	3.30	0.51	0.99

	Chlorophyll mg m^{-3}	Carbon mg m^{-3}	Nitrogen mg m^{-3}	ATP mg m^{-3}
Whole Sample	0.42	130	22	0.352
<1 µm Fraction	0.22	68	8	0.010

	RNA mg m^{-3}	DNA mg m^{-3}	Protein mg m^{-3}
Whole Sample	6.56	8.08	132.5
<1 µm Fraction	1.44	0.56	52.5

Latitude 68°21'N Longitude 79°58'W Date: 04:09:81

Depth m	Nitrate mg at m^{-3}	Silicate mg at m^{-3}	Phosphate mg at m^{-3}	Ammonia mg at m^{-3}
40	1.42	2.96	0.86	1.43

	Chlorophyll mg m^{-3}	Carbon mg m^{-3}	Nitrogen mg m^{-3}	ATP mg m^{-3}
Whole Sample	1.05	253	26	0.458
<1 µm Fraction	-	55	8	-

	RNA mg m^{-3}	DNA mg m^{-3}	Protein mg m^{-3}
Whole Sample	5.30	7.85	124.3
<1 µm Fraction	-	-	-

FOXE BASIN

Latitude 69°42'N Longitude 81°51'W Date: 05:09:81

Depth m	Nitrate mg at m^{-3}	Silicate mg at m^{-3}	Phosphate mg at m^{-3}	Ammonia mg at m^{-3}
40	1.18	4.10	0.70	1.01

	Chlorophyll mg m^{-3}	Carbon mg m^{-3}	Nitrogen mg m^{-3}	ATP mg m^{-3}
Whole Sample	1.40	105	20	0.664
<1 µm Fraction	0.16	56	7	0.051

	RNA mg m^{-3}	DNA mg m^{-3}	Protein mg m^{-3}
Whole Sample	4.67	3.58	123.5
<1 µm Fraction	1.26	0.61	12.0

Latitude 69°00'N Longitude 79°54'W Date: 06:09:81

Depth m	Nitrate mg at m^{-3}	Silicate mg at m^{-3}	Phosphate mg at m^{-3}	Ammonia mg at m^{-3}
35	0.25	2.94	0.67	1.49

	Chlorophyll mg m^{-3}	Carbon mg m^{-3}	Nitrogen mg m^{-3}	ATP mg m^{-3}
Whole Sample	0.48	111	19	0.374
<1 µm Fraction	0.18	36	10	0.013

	RNA mg m^{-3}	DNA mg m^{-3}	Protein mg m^{-3}
Whole Sample	3.60	4.09	87.8
<1 µm Fraction	0.18	1.69	-

FOXE BASIN

Latitude 68°22'N Longitude 80°67'W Date: 07:09:81

Depth m	Nitrate mg at m^{-3}	Silicate mg at m^{-3}	Phosphate mg at m^{-3}	Ammonia mg at m^{-3}
2	0.16	3.88	0.51	0.96

	Chlorophyll mg m^{-3}	Carbon mg m^{-3}	Nitrogen mg m^{-3}	ATP mg m^{-3}
Whole Sample	0.84	198	20	0.274
<1 µm Fraction	0.22	84	14	0.016

	RNA mg m^{-3}	DNA mg m^{-3}	Protein mg m^{-3}
Whole Sample	3.96	5.22	109.0
<1 µm Fraction	2.88	3.19	20.6

LIGHT SATURATION DATA AND PARAMETER ESTIMATES

Units

P = mg C $m^{-3}h^{-1}$(mg Chl)$^{-1}$

I = W m^{-2}

P_s = mg C mg Chl$^{-1}h^{-1}$

α = mg C(mg Chl)$^{-1}h^{-1}W^{-1}m^{-2}$

β = mg C(mg Chl)$^{-1}h^{-1}W^{-1}m^{-2}$

Organic particulate concentrations are in mg m^{-3} and nutrients are in mg at m^{-3}. The 90% confidence interval for P_s, α and β are shown in the closed brackets below the estimates for each parameter.

131	2.07	116	2.07	97	2.25	82	1.81
66	1.83	57	1.76	47	1.70	39	1.39
34	1.75	29	1.33	27	.94	20	1.17
18	1.27	13	1.00	13	.97	9	.50
9	.67	7	.57	7	.35	4	.41
4	.20	3	.35	3	.34		

PARAMETER VALUES

PS :	2.63	ALPHA :	.066	BETA :	.0028
(2.47,	2.79)	(.060,	.072)	(.0023,	.0033)

SAMPLE TEMPERATURE 1.5 C INCUBATION TEMPERATURE 1.5 C

CHLOROPHYLL :	.22	RNA :	1.71	PHOSPHATE :	.77
CARBON :	126	DNA :	7.10	NITRATE :	.64
NITROGEN :	22	ATP :	.55	SILICATE :	2.20
		PROTEIN:	44.50	AMMONIA :	1.08

33	1.37	25	1.03	24	.95	19	.81
17	.81	13	.51	13	.60	11	.39
10	.44	8	.31	7	.28	5	.16
5	.16	4	.12	4	.24		

PARAMETER VALUES

PS :	2.86	ALPHA :	.047	BETA :	.0037
(2.66,	3.06)	(.044,	.051)	(.0030,	.0044)

SAMPLE TEMPERATURE 1.5 C INCUBATION TEMPERATURE 1.5 C

CHLOROPHYLL :	.78	RNA :	4.49	PHOSPHATE :	.75
CARBON :	130	DNA :	4.89	NITRATE :	.39
NITROGEN :	25	ATP :	.57	SILICATE :	2.37
		PROTEIN:	78.60	AMMONIA :	1.03

124	1.55	102	1.53	89	1.58	72	1.59
63	1.67	55	1.68	44	1.74	36	1.62
34	1.49	30	1.31	24	1.38	22	1.36
17	.95	14	1.10	13	.74	10	.89
9	.61	7	.60	6	.32	6	.46
4	.39	4	.34	3	.23	3	.22
3	.20	2	.19				

PARAMETER VALUES

PS : 2.17	ALPHA : .084	BETA : .0039
(2.02, 2.31)	(.076, .092)	(.0032, .0045)

SAMPLE TEMPERATURE 1.4 C INCUBATION TEMPERATURE 1.0 C

CHLOROPHYLL : 1.03	RNA : 2.34	PHOSPHATE : .58
CARBON : 144	DNA : 3.71	NITRATE : 1.83
NITROGEN : 16	ATP : .79	SILICATE : 2.77
	PROTEIN: 91.00	AMMONIA : 1.81

29	1.54	23	1.15	18	1.45	17	.85
15	.95	11	.72	10	.62	8	.63
7	.60	7	.50	5	.37	4	.24
3	.38	3	.27	2	.18		

PARAMETER VALUES

PS : 2.84	ALPHA : .067	BETA : .0031
(2.65, 3.03)	(.061, .073)	(.0025, .0037)

SAMPLE TEMPERATURE 1.3 C INCUBATION TEMPERATURE 1.5 C

CHLOROPHYLL : .48	RNA : 5.21	PHOSPHATE : .79
CARBON : 106	DNA : 4.89	NITRATE : .27
NITROGEN : 19	ATP : .50	SILICATE : 1.83
	PROTEIN: 85.80	AMMONIA : .99

189	1.77	164	1.87	134	1.85	106	1.68
96	1.71	85	1.78	69	1.15	60	1.47
48	1.36	38	1.35	32	.92	28	1.01
20	.79	19	.72	16	.62	14	.58
12	.38	11	.43	8	.26	8	.44
6	.27	6	.19	4	.19	4	.15
3	.08	3	.10				

PARAMETER VALUES

PS :	2.82	ALPHA :	.036	BETA :	.0033
(2.56,	3.07)	(.033,	.039)	(.0025,	.0040)

SAMPLE TEMPERATURE 1.5 C INCUBATION TEMPERATURE 1.5 C

CHLOROPHYLL :	.44	RNA :	3.86	PHOSPHATE :	.63
CARBON :	166	DNA :	4.32	NITRATE :	.42
NITROGEN :	20	ATP :	.45	SILICATE :	1.76
		PROTEIN:	81.10	AMMONIA :	1.30

27	.98	19	.78	18	.74	12	.60
12	.62	9	.49	9	.45	7	.35
6	.42	5	.22	4	.30	4	.21
3	.20	3	.11	2	.14		

PARAMETER VALUES

PS : 1.49	ALPHA : .056	BETA : .0009
(1.43, 1.55)	(.052, .061)	(.0008, .0011)

SAMPLE TEMPERATURE 1.5 C INCUBATION TEMPERATURE 1.5 C

CHLOROPHYLL : 1.71	RNA : -	PHOSPHATE : -
CARBON : -	DNA : -	NITRATE : -
NITROGEN : -	ATP : -	SILICATE : -
	PROTEIN: -	AMMONIA : -

76	2.23	61	2.25	48	.98	40	2.03
36	1.60	28	1.71	27	1.40	18	.94
17	1.16	14	.95	13	.79	9	.73
8	.52	7	.54	6	.42	4	.30
4	.22	3	.11	3	.29	2	.13
2	.24	1	.15				

PARAMETER VALUES

PS : 3.47 (3.25, 3.70)

ALPHA : .060 (.055, .065)

BETA : .0026 (.0020, .0032)

SAMPLE TEMPERATURE 1.5 C

INCUBATION TEMPERATURE 1.3 C

CHLOROPHYLL :	.42	RNA :	6.56	PHOSPHATE :	.51
CARBON :	130	DNA :	8.08	NITRATE :	.12
NITROGEN :	22	ATP :	.35	SILICATE :	3.30
		PROTEIN:	132.50	AMMONIA :	.99

27	.21	19	.10	18	.28	12	.21
12	.02	9	.36	9	.19	7	.24
6	.14	5	.00	4	.02	4	.00
3	.13	3	.00	2	.00		

PARAMETER VALUES

PS :	.65	ALPHA :	.011	BETA :	.0003
(.57,	.73)	(.009,	.013)	(.0002,	.0005)

SAMPLE TEMPERATURE 1.5 C INCUBATION TEMPERATURE 1.3 C

CHLOROPHYLL :	.22	RNA :	1.44	PHOSPHATE :	.51
CARBON :	68	DNA :	.56	NITRATE :	.12
NITROGEN :	8	ATP :	.01	SILICATE :	3.30
		PROTEIN:	52.50	AMMONIA :	.99

135	1.80	136	1.70	102	1.74	96	1.74
73	1.64	70	1.42	54	1.61	44	1.52
40	1.60	32	1.35	29	1.40	20	1.19
20	1.03	16	.87	15	.85	13	.60
11	.53	10	.55	8	.37	7	.45
5	.26	5	.42	4	.28	4	.22
3	.28	2	.17	2	.20		

PARAMETER VALUES

PS : 2.34	ALPHA : .063	BETA : .0036
(2.19, 2.50)	(.057, .068)	(.0029, .0042)

SAMPLE TEMPERATURE .3 C INCUBATION TEMPERATURE 1.0 C

CHLOROPHYLL :	1.05	RNA :	5.30	PHOSPHATE :	.86
CARBON :	253	DNA :	7.85	NITRATE :	1.42
NITROGEN :	26	ATP :	.46	SILICATE :	2.96
		PROTEIN:	124.30	AMMONIA :	1.43

14	.77	11	.58	11	.60	8	.40
7	.49	5	.38	5	.30	4	.23
4	.22	3	.17	3	.18	2	.13
2	.14						

PARAMETER VALUES

PS :	1.93	ALPHA :	.061	BETA :	.0031
(1.81,	2.05)	(.055,	.066)	(.0025,	.0036)

SAMPLE TEMPERATURE .3 C INCUBATION TEMPERATURE 1.0 C

CHLOROPHYLL :	1.40	RNA :	4.67	PHOSPHATE :	.70
CARBON :	105	DNA :	3.58	NITRATE :	1.18
NITROGEN :	20	ATP :	.66	SILICATE :	4.10
		PROTEIN:	123.50	AMMONIA :	1.01

36	.97	30	1.07	26	.70	23	.72
18	.61	17	.54	13	.42	12	.40
9	.31	8	.31	6	.23	5	.29
4	.17	4	.14	3	.11	3	.15

PARAMETER VALUES

PS : 1.80	ALPHA : .039	BETA : .0024
(1.64, 1.96)	(.036, .043)	(.0019, .0029)

SAMPLE TEMPERATURE .3 C INCUBATION TEMPERATURE 1.0 C

CHLOROPHYLL : 1.43	RNA : -	PHOSPHATE : -
CARBON : -	DNA : -	NITRATE : -
NITROGEN : -	ATP : -	SILICATE : -
	PROTEIN: -	AMMONIA : -

9	.60	7	.34	6	.33	4	.31
4	.35	3	.22	3	.18	2	.15
2	.15	1	.13	1	.11	1	.05
1	.06						

PARAMETER VALUES

PS :	2.08	ALPHA :	.063	BETA :	.0024
(1.99,	2.17)	(.059,	.067)	(.0020,	.0028)

SAMPLE TEMPERATURE 2.1 C INCUBATION TEMPERATURE 1.0 C

CHLOROPHYLL :	.84	RNA :	3.96	PHOSPHATE :	.51
CARBON :	198	DNA :	5.22	NITRATE :	.16
NITROGEN :	20	ATP :	.27	SILICATE :	3.88
		PROTEIN:	109.00	AMMONIA :	.96

129	2.49	99	2.11	96	2.28	80	1.77
74	1.89	61	1.89	57	1.73	41	1.68
40	1.45	29	1.39	29	1.28	21	.89
20	.96	15	.73	14	.77	10	.62
9	.55	7	.47	6	.58	4	.38
4	.36	4	.23	3	.22	3	.18
2	.10	2	.05	1	.06		

PARAMETER VALUES

PS :	2.86	ALPHA :	.056	BETA :	.0026
(2.73,	3.00)	(.052,	.059)	(.0021,	.0030)

SAMPLE TEMPERATURE 2.1 C INCUBATION TEMPERATURE 1.0 C

CHLOROPHYLL :	.22	RNA :	2.68	PHOSPHATE :	.51
CARBON :	94	DNA :	3.19	NITRATE :	.16
NITROGEN :	14	ATP :	.02	SILICATE :	3.88
		PROTEIN:	20.60	AMMONIA :	.96

Fig. 1. Location of sampling stations in Foxe Basin.